



Momentum of Climate Change: Trends and Emerging Issues

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MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION

Protecting Maine's Air, Land and Water

LEGACY OF ACTION

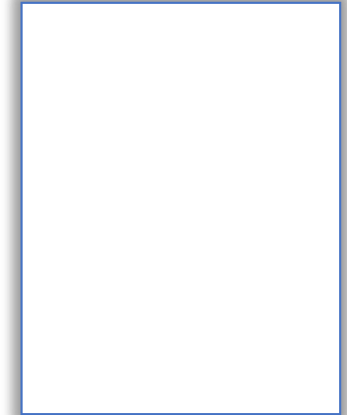
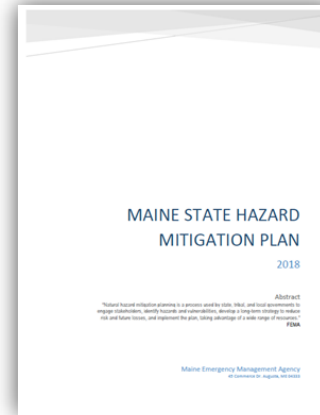
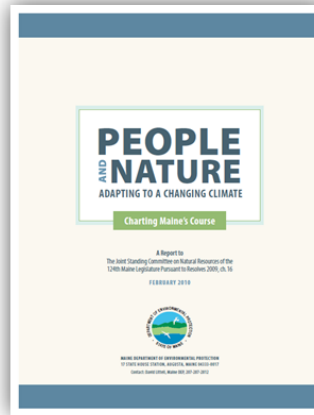
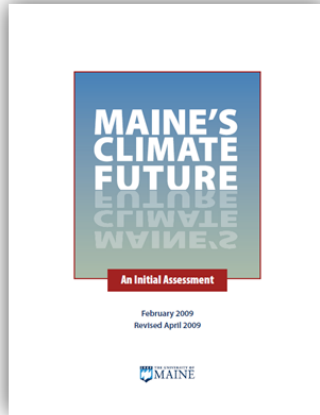
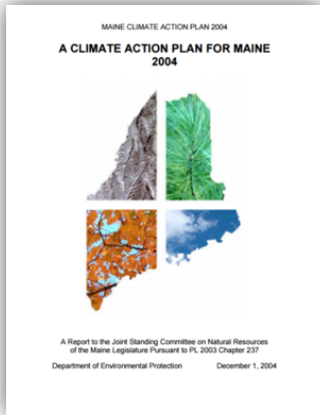
Mitigation

Impact Assessment

Adaptation

Preparedness

Unified



Climate Action Plan
2004

Climate Future
2009

Adaptation Plan
2010

Hazard Mitigation Plan
2018

Unified Climate
Action Plan 2020

Sector specific adaptation planning >

Transportation

Health

Interagency

Wildlife

Progress every 2 years

*Update 2015
Coastal 2018*

*Sector Specific
Planning*

*1st 1987
Update every 5 years*

*Progress every 2 years
Update every 4 years*

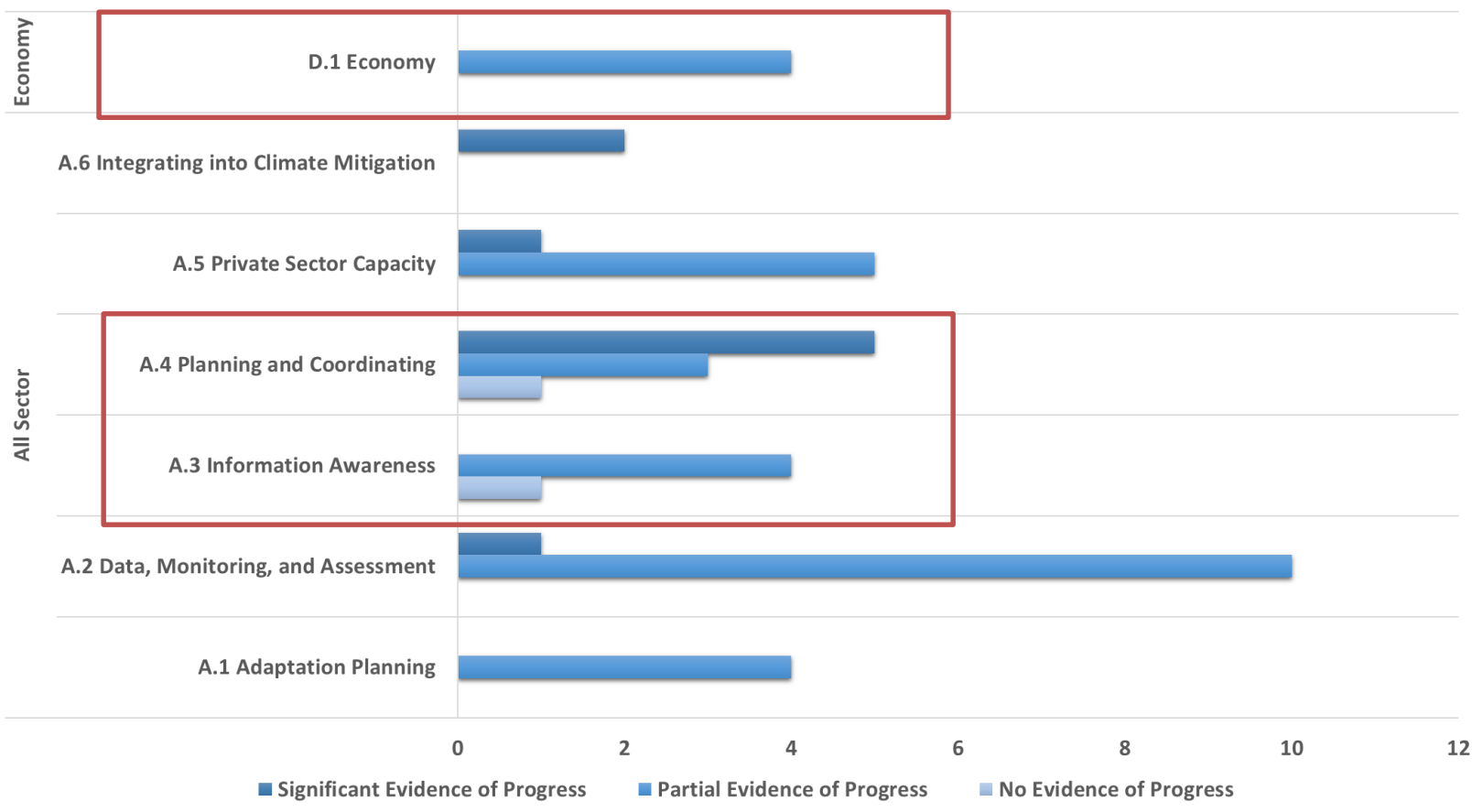
LD 845 An Act To Provide Leadership in Addressing the Threat of Climate Change (2003)

LD 460 Resolve to Evaluate Climate Change Adaptation Options for the State (2009)

LD 825 Resolve to Study Climate Change and Implement the Recommendations of the Department of Environmental Protection Report on Climate Change (2013)

LD 1679 An Act To Promote Clean Energy Jobs and To Establish the Maine Climate Council (2019)

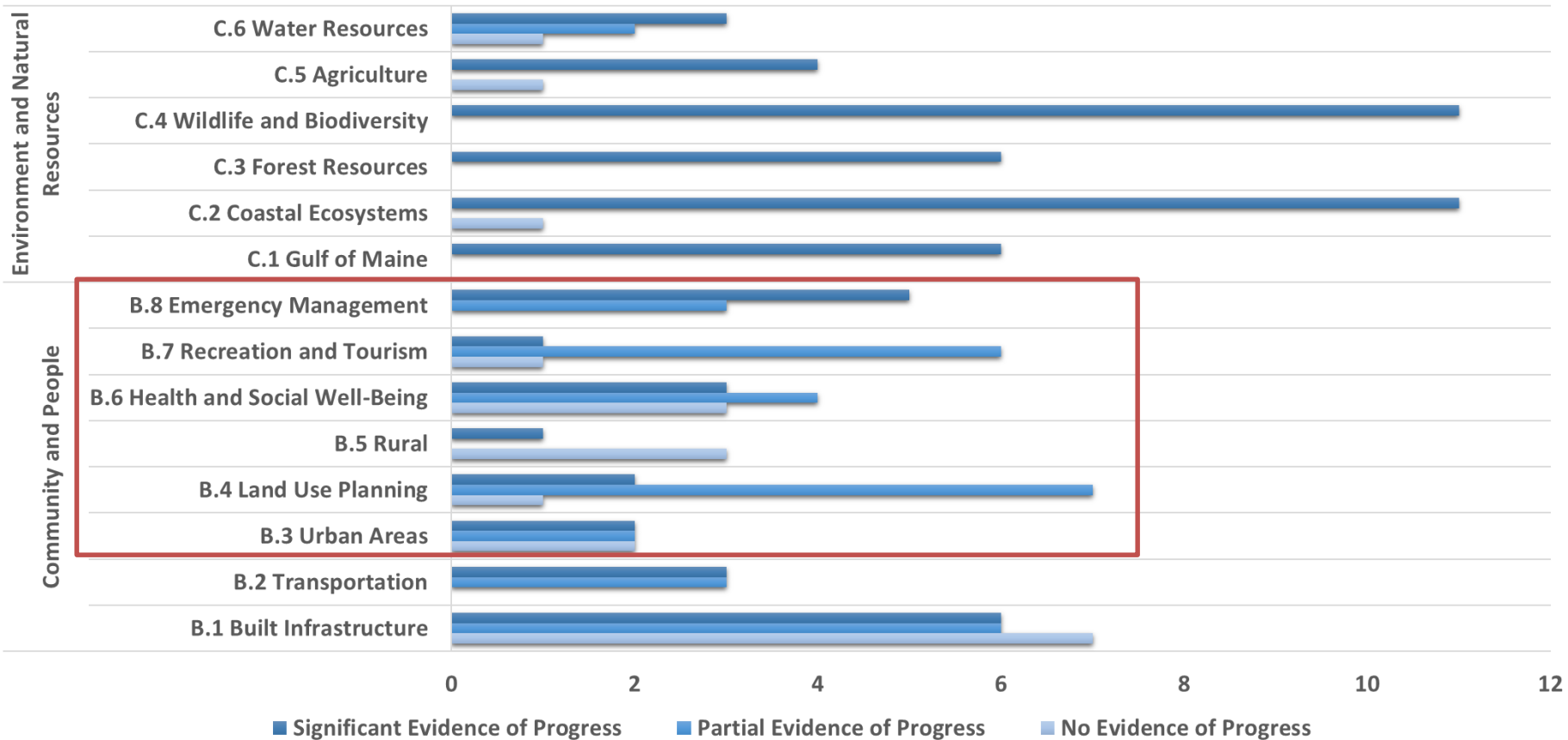
2010 Maine Adaptation Plan Status of Recommendations



Categories	No Evidence of Progress	Partial Evidence of Progress	Significant Evidence of Progress	Grand Total
All Sector	2	27	9	38
Economy		6		6
Grand Total	2	33	9	44



2010 Maine Adaptation Plan Status of Recommendations



Categories	No Evidence of Progress	Partial Evidence of Progress	Significant Evidence of Progress	Grand Total
Community and People	17	32	23	72
Environment and Natural Resources	3	3	41	47
Grand Total	20	35	64	119



Successes Since 2010

- **Coalition of Partners** - maintaining
- **Climate Change Liaisons** - building from MICA
- **Standing Organizational Structure** - Maine Climate Council
- **Data, Monitoring, Assessment** - data development and assessment
- **Info Awareness** - availability and use
- **Decision Support Tools** - infrastructure design best practices, certain sectors
- **Sector Specific Implementation Plans** - some developed, preliminary
- **Implementation** - in some sectors



Challenges Since 2010

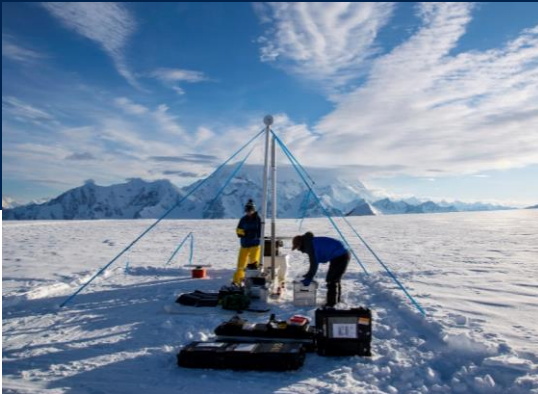
- **Long-Term Monitoring** – network density and types; local hazard information
- **Assistance and Coordination** - private & public sector
- **Capacity** - lacks at all levels; across providers and actors (flexible, tailorable); across hazards and sectors (multi-hazard, holistic, common objectives)
- **Best practice handbooks** – operational manuals “how to” guides
- **Codes and regulations** – up-to-date knowledge; help not hinder (maladaptive)
- **Economic impacts** – assessment; short vs. long-term; action vs. no action; no regrets
- **Funding and financing** - existing sources; new sources; delivery
- **Tracking and evaluation** – tool development





CLIMATE CHANGE FRAMEWORK

Science, Technology & Engineering (Applied & Basic)



Climate Change Institute *Global leader in Climate Science*

Maine Climate Office
- Maine State Climatologist Office



Centers and Institutes

Maine Sea Grant
UMaine Extension



Academic Areas (Schools and Departments)

- Marine Sciences
- Ecology
- Geology
- Economics
- Forestry
- Social Science
- Agriculture
- Health

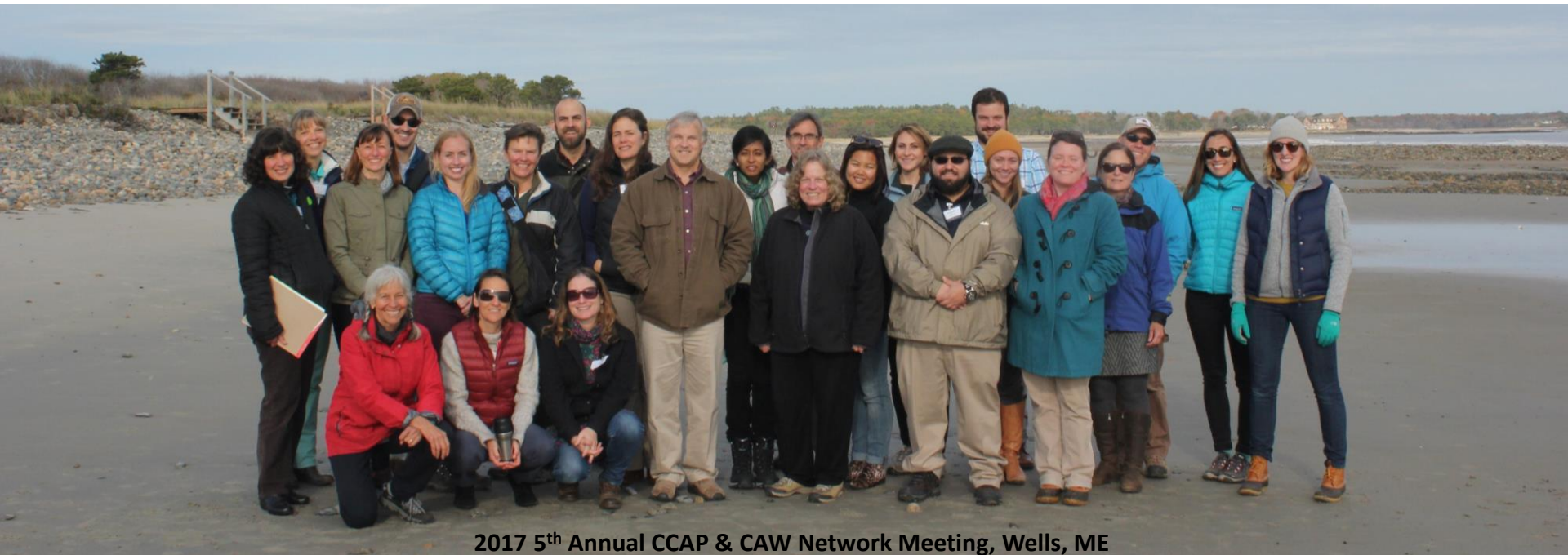
Climate Change Adaptation Providers Network (CCAP)



2018 Spring CCAP Network Meeting, Brunswick, ME

Purpose....

- **Knowledge** exchange, peer-to-peer learning
- Improve **communication** across practitioners
- Share **opportunities** funding/training/events
- Chart **shared roles** and responsibilities
- **Collaborate** on projects
- Determine **mutual goals** and activities



2017 5th Annual CCAP & CAW Network Meeting, Wells, ME

2019 Barriers to a Changing Climate, Longitudinal Study



Bowdoin

1865 THE UNIVERSITY OF
MAINE
Cooperative Extension

Sea Grant
Maine

THE UNIVERSITY OF MAINE AT
MACHIAS

Climate Adaptation Actions

I have compelling information about anticipated future risks of climate change.

I am taking action in my work to adapt to coastal climate problems.

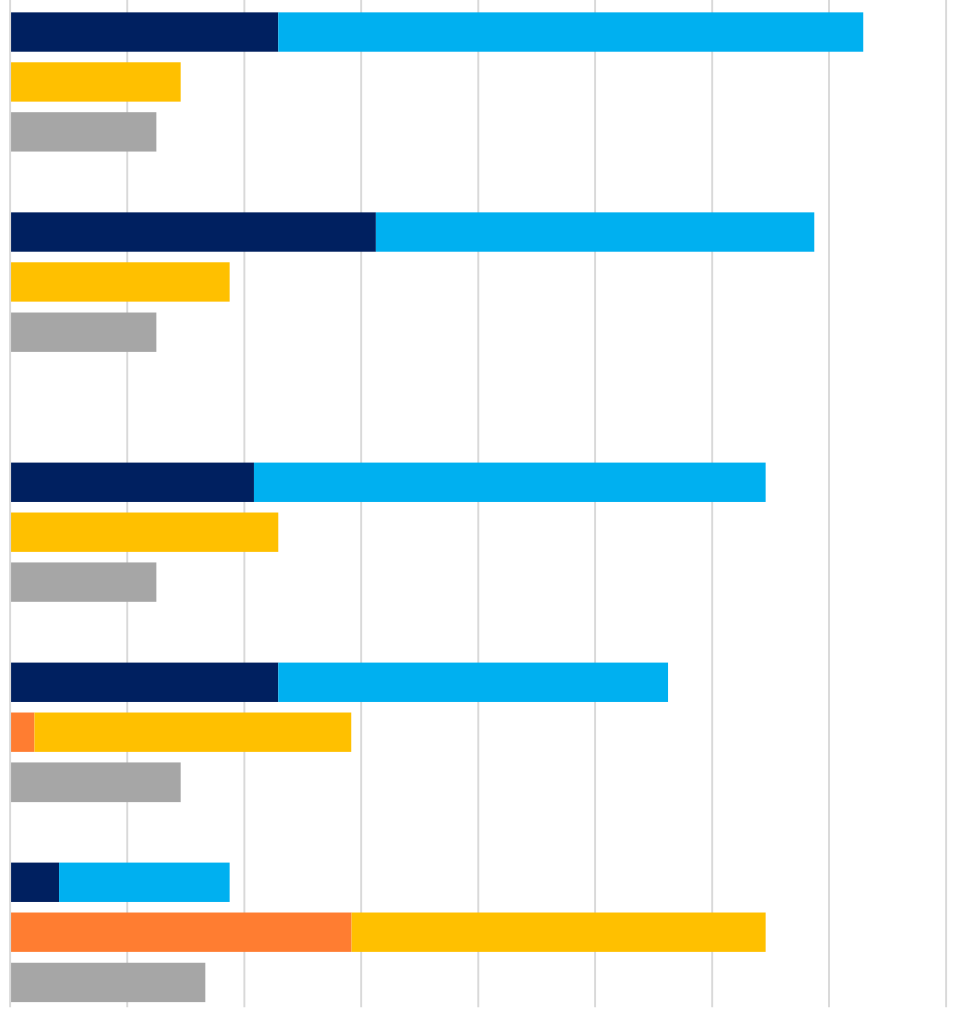
I devote time and resources to taking action.

I am taking a leadership role on this issue.

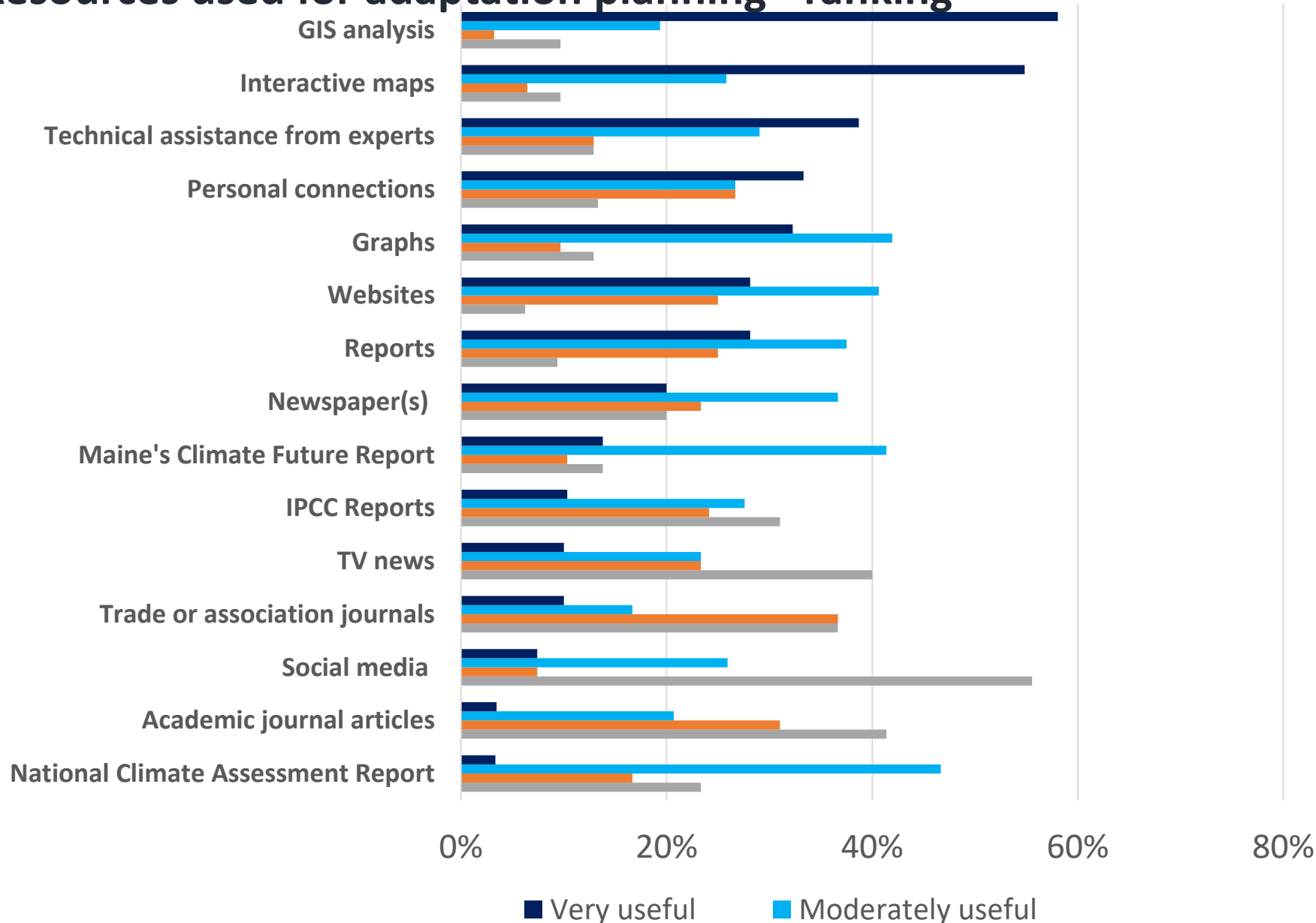
I have adequate funding to take action regarding this issue in my work.

Strongly agree Agree Strongly disagree Disagree No opinion

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8

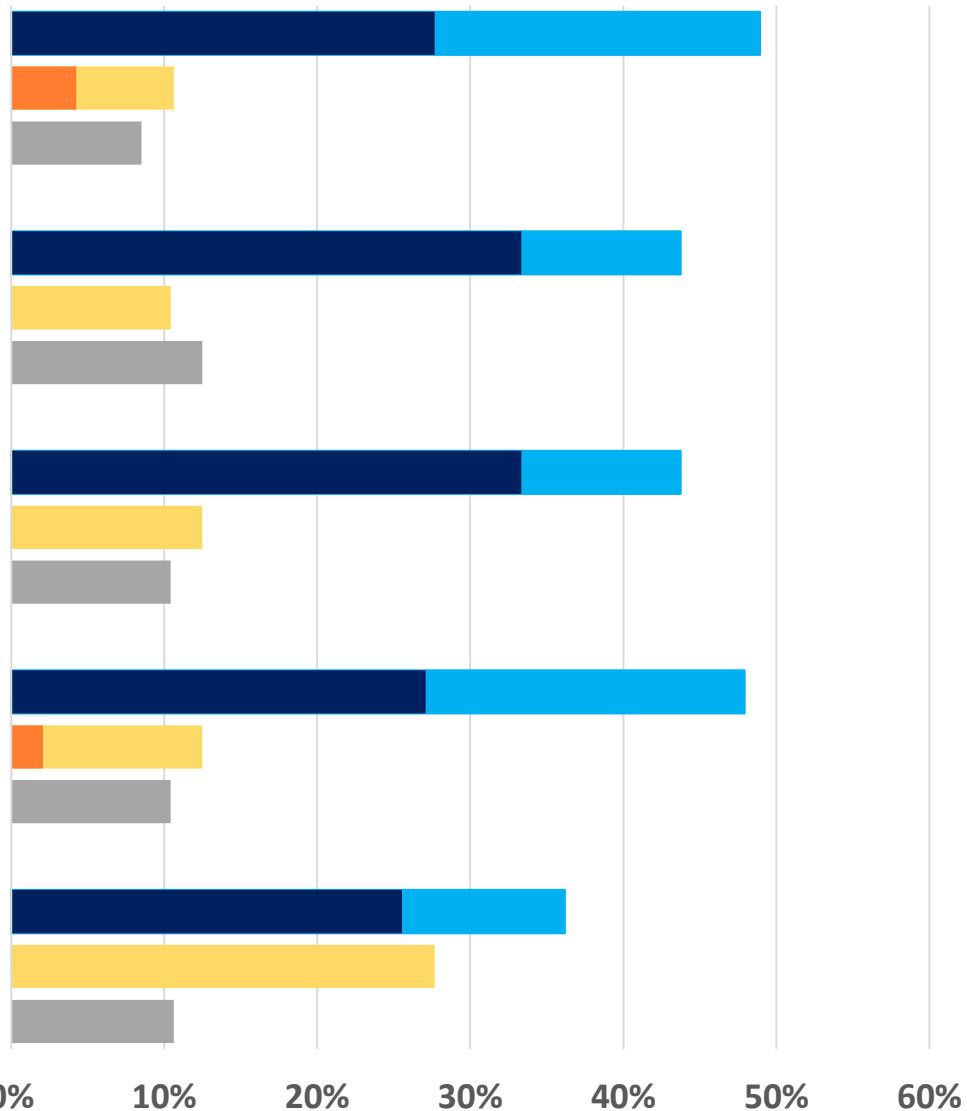


Resources used for adaptation planning - ranking



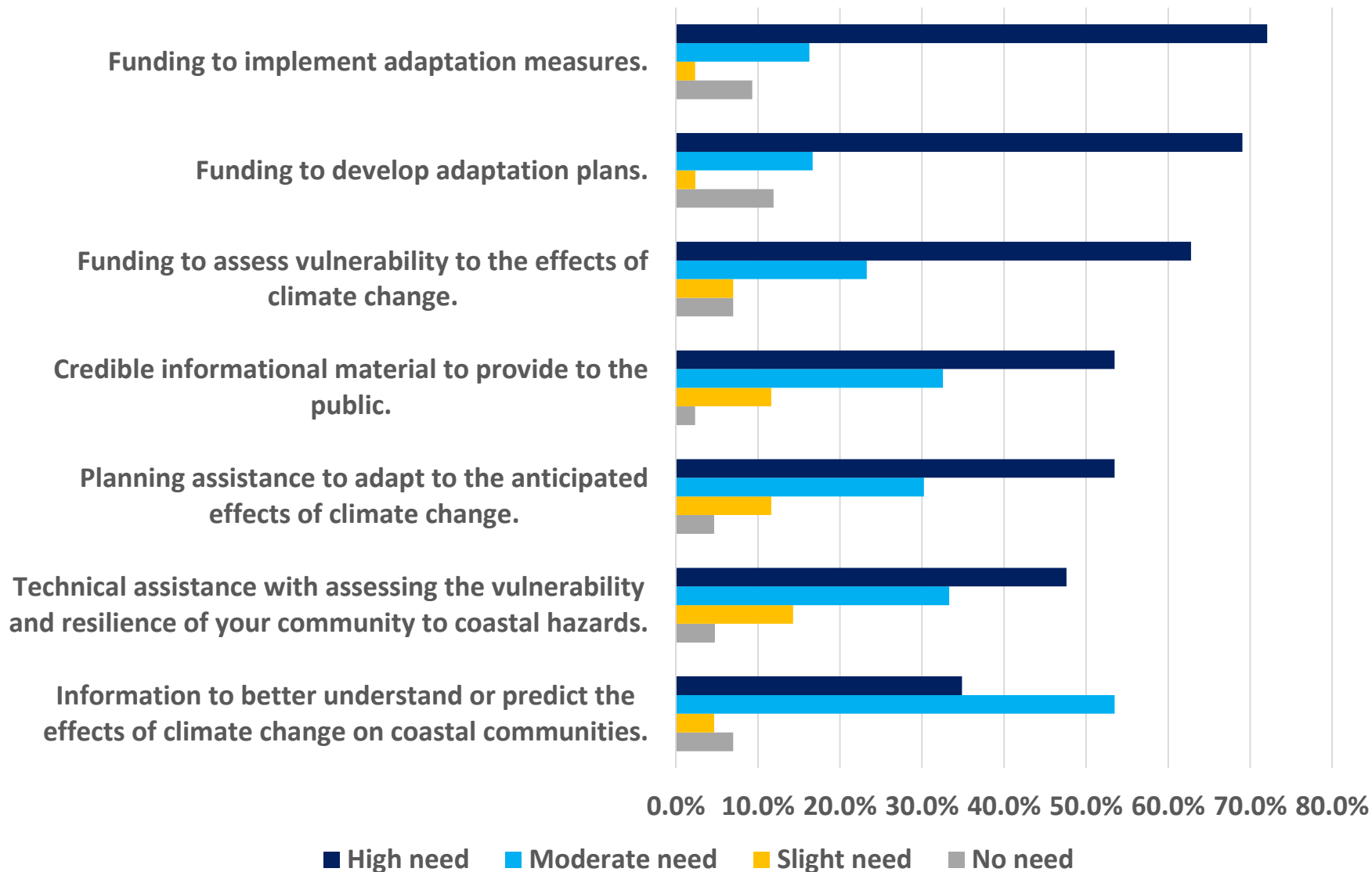
Status of adaptation planning

My municipality or organization is coordinating with other entities in taking steps to prepare for the effects of climate change.



Strongly agree Agree Strongly disagree Disagree No opinion

Municipal needs for adaptation planning



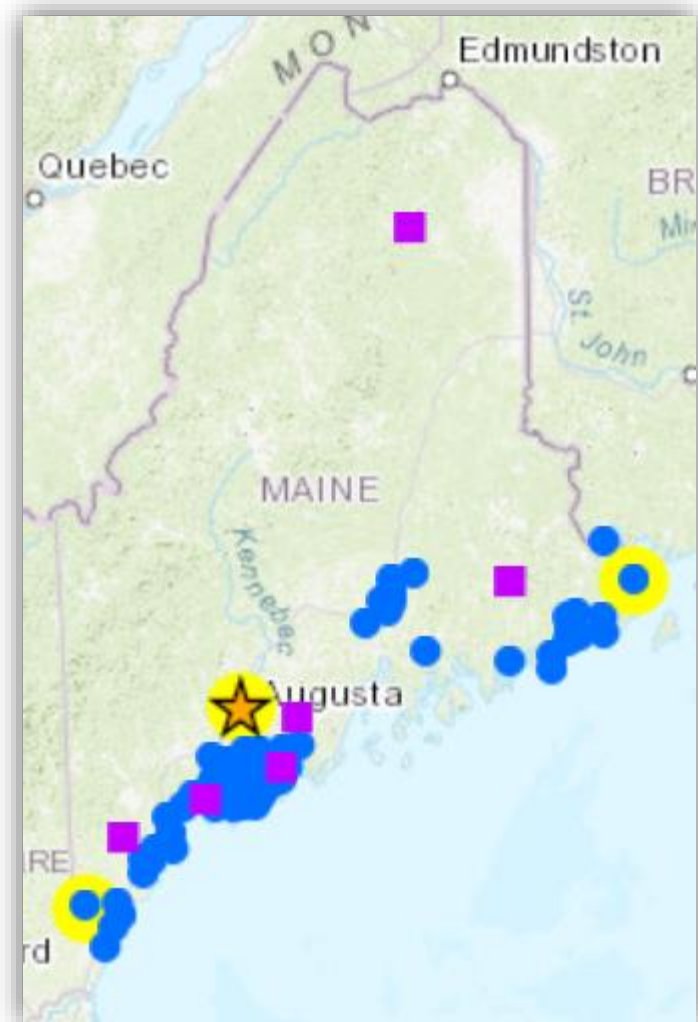
Example: On the Coast...

RESILIENCE AND ADAPTATION IN NEW ENGLAND (EPA RAINE DATABASE)

61 Communities:

- ✓ Sea level rise
- ✓ Adaptation plans
- ✓ Vulnerability assessments
- ✓ Communication and outreach
- ✓ Communities with case studies

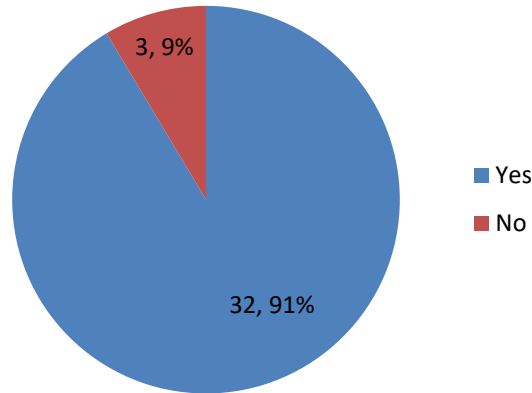
- ☐ Across All Climate Changes
- ☐ Across All Sectors
- ☐ Complete Geographical Distribution
- ☐ Equitable Process and Outcomes
- ☐ Resilience Outcomes



<https://www.epa.gov/raine>

Example: WWUs in Maine...

Have Your Facility's Operations ever been Impacted by Extreme Weather Events?



Arranged in order of those highest to least reported in the survey of southern Maine wastewater facilities:

- Heavy Precipitation & Floods
- Severe Storms
- Sea Level Rise
- Storm Surge with Sea Level Rise
- Ocean Acidification
- Drought
- Ice Storms
- Heavy Snowfall
- Stronger winds
- Temperature changes

Survey Questions	Yes	No
Have you made any Plans to Protect Assets from changes in climate?	47%	53%
Is climate adaptation part of the annual budget	0%	100%
Would you ever consider adding climate adaptation to your annual budget?	61%	39%



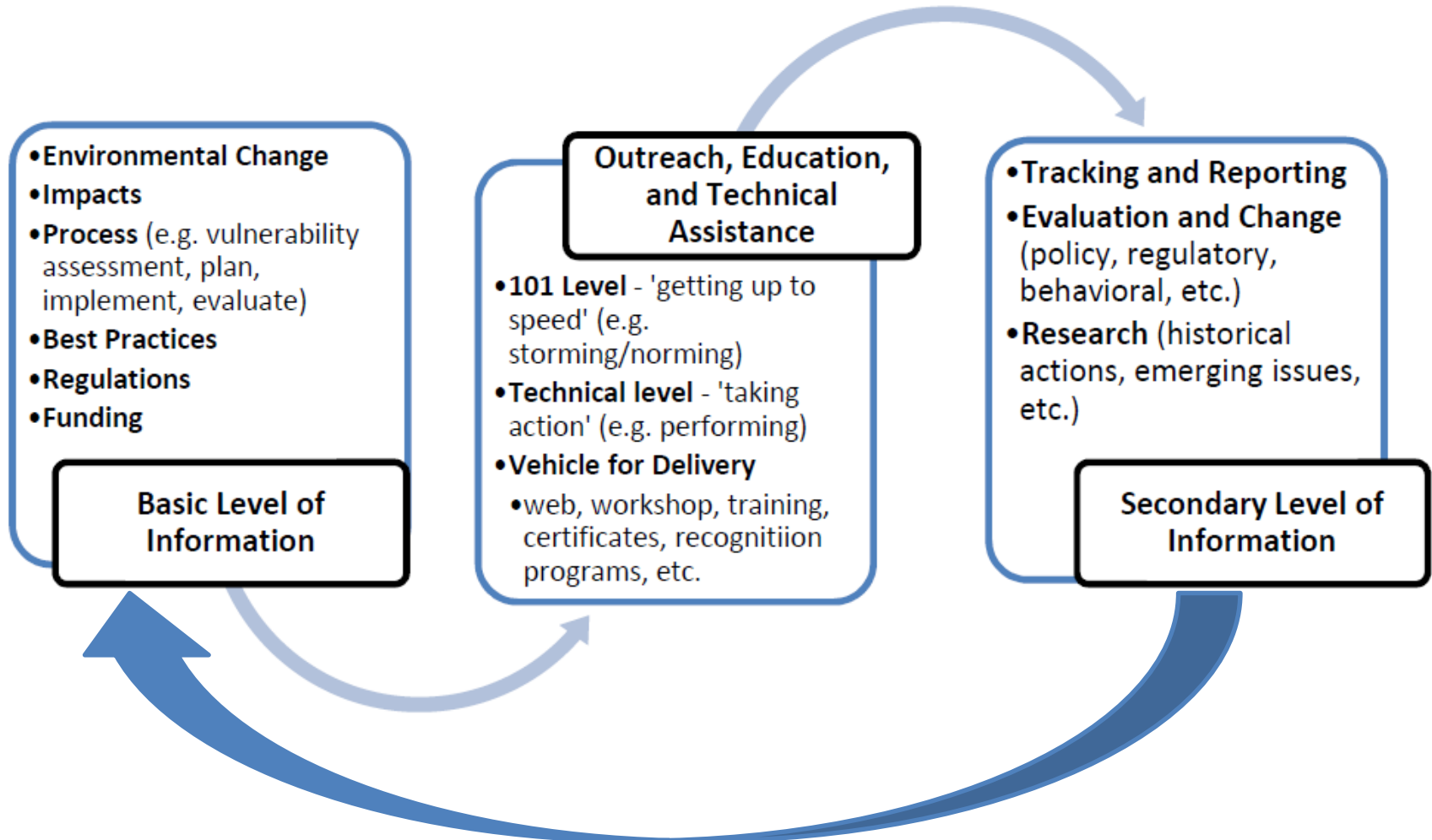
Day-to-Day Operational Work

What We Know and Do

versus

Taking Stock

Opportunities as We Can



Integrate climate as consideration into activities

Support municipalities, businesses, and individuals to become sustainable and resilient

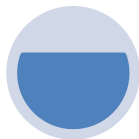
Develop and integrate a Climate Lens...

“co-beneficial action to existing actions”



**Project, Program,
Initiative**

Existing or new



Climate Lens

*Guidance or
requirement*



Outcome

*Sustainable and
resilient*



1. Community Landscape

- Characterization, Location, Systems
- Timeframes
- Partnerships and Teams
- *Diverse, Interdisciplinary, Inclusive*

2. Risk & Vulnerability

- Data, Tools, Models, Knowledge
- Exposure and Sensitivity, Adaptive Capacity and Potential Impacts
- *Past, Present, Future, Geographical, Economic, Human/Social, Critical Infrastructure, Built and Natural Environment*

3. Plan & Prioritize

- Prioritize Vulnerabilities
- Identify, Evaluate, and Prioritize Strategies
- *Appropriate Scales/Scalable, Risk-Based Planning, Robust, Redundant, Resourceful, Feasible, Compatible, Cost-Effective, Equitable, Objective*

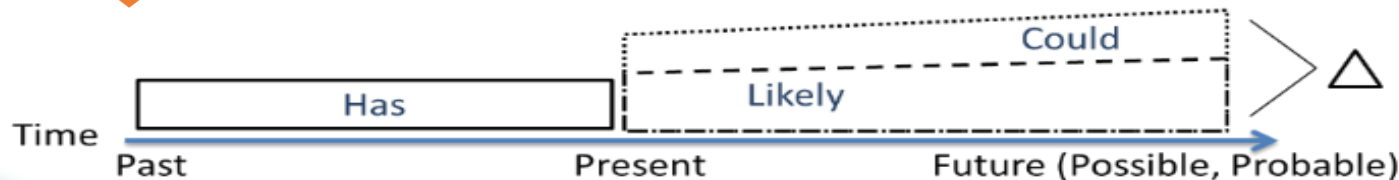
4. Implement

- Chronic/Acute Hazards
- Long/Short-Term Actions
- *Hazard Mitigation linked with Adaptation*

5. Monitor / Evaluate & Adapt

- Resilience Indicators
- Criteria
- *Metrics and Evaluation*

Components | Criteria



Risk Assessment Framework

Developed to aid climate adaptation efforts by providing orientation to a sample process that is informed by best practices identified through state and regional climate resources found on the state's climate webpages.

Key Challenges Re-Cap

- ☐ Available and Accessible Funding
- ☐ Accessible Information and Consistent Response
- ☐ Lack of Capacity
- ☐ Home Rule
- ☐ Temporal Changes



“Climate Lens” Network Opportunities

- [Climate Network Gulf of Maine Council](#) (GoMC) - [Climate Network](#)
- [Climate Smart Land Network](#) (CSLN)
- [Infrastructure and Climate Network](#) (ICNet)
- [Local Governments for Sustainability](#)
- [Maine Interagency Work Groups](#) (MICA)
- Maine Climate Change Adaptation Providers Network (CCAP)
- [Maine Ocean Acidification Partnership](#) / [Northeast Coastal Acidification Network](#) (NECAN)
- [New England Federal Partners](#)
- New England Governors and Eastern Canadian Premiers – [Adaptation](#), [Ecological Connectivity](#)
- [New England Municipal Sustainability Network](#)
- [North Atlantic Landscape Conservation Cooperative Network](#)
- [Northeast Climate Hub](#)
- [Northeast Ocean Data](#)
- [Northeast Regional Association of Coastal and Ocean Observing Systems](#) (NERACOOS)
- [Northeast Regional Climate Center](#)
- [Northeast Regional Ocean Council](#) (NROC) - [Coastal Hazards Resilience](#)
- [Regional Association for Research on the Gulf of Maine](#) (RARGOM)
- [Staying Connecting Initiative](#)
- University of Maine - Cooperative Extension, Sea Grant, Climate Change Institute, Margaret Chase Smith Center, Mitchell Center, Muskie School, Darling Marine Center
- [Urban Sustainability Directors Network](#)
- [US Climate Alliance](#)
- [US Global Change Research Program](#)





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